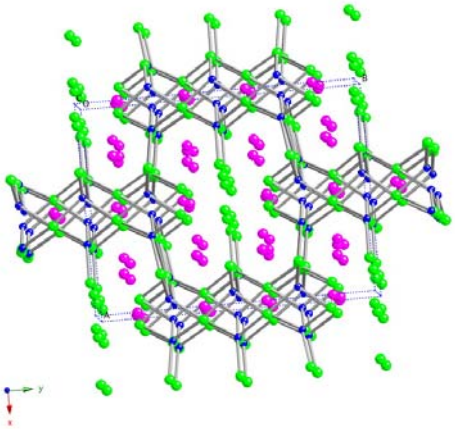
Synthesis and Characterization of New Transition Metal Pnictides and Pnictide Oxides

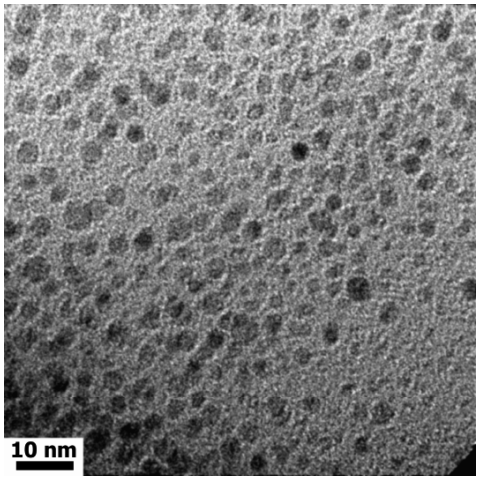
Susan M. Kauzlarich, University of California, Davis, DMR-0120990

The motivation for investigating new transition metal pnictides lies not only in their potential for offering new structure types and unique bonding arrangements but also in their possible materials applications. We have recently prepared two new phases: $Ca_{21}Mn_4Sb_{18}$ and $Eu_{10}Mn_6Sb_{13}$ (shown below). Both are semiconductors with ferrimagnetic order.

A view of the structure of $Eu_{10}Mn_6Sb_{13}$. *Inorg Chem. 2003*



In addition, we are using main group Zintl phases to explore the synthesis of alkyl-terminated Silicon nanoparticles. These materials have applications as soluble forms of Silicon for low-temperature thin film production.



HRTEM of Silicon nanoparticles prepared from bromine oxidation of Mg_2Si. *Chem. Mater. 2003*

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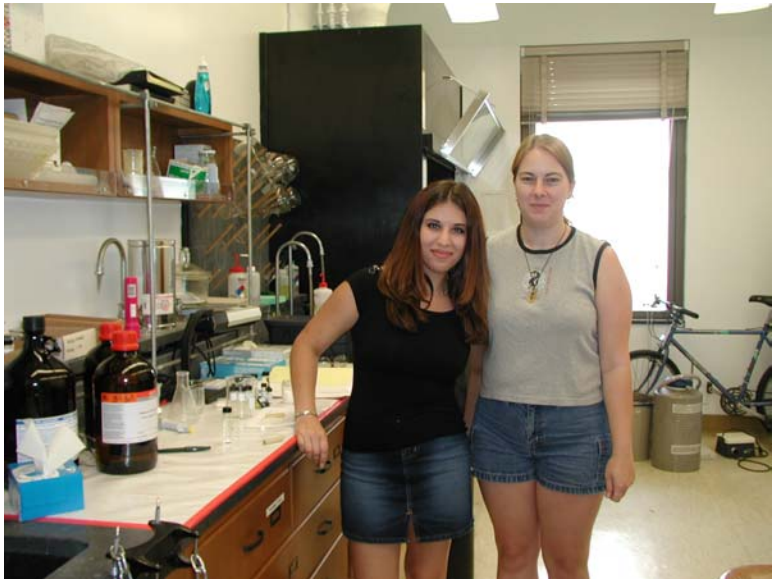
Education:

One undergraduate, Cathie Condron, and two graduate students from UC Davis, Aaron Holm, and Hyungrak Kim, contributed to this work. Kathy Pettigrew has been funded by a NEAT (Nanoparticles in the Environment, Agriculture and Technology) IGERT at UCDavis. I teach an overload course for the IGERT entitled "Collaborations in Research" for students from various disciplines. The emphasis is on communication, thinking outside the confines of your discipline and working together on a complex problem.

Outreach:

The PI participates in the ACS SEED program and MURPPS. The PI has also hosted a visitor from Thailand, Supitcha Thongchant.



ACS Summer SEED student, Ana Calderon, with graduate student, Katherine Pettigrew.